

APPENDIX A

United States Patent [19]**Odani et al.**[11] **Patent Number:** **5,059,491**[45] **Date of Patent:** **Oct. 22, 1991**[54] **CERMET BLADE MEMBER FOR CUTTING-TOOLS AND PROCESS FOR PRODUCING SAME**[75] **Inventors:** Niro Odani; Kazuyoshi Yoshioka; Sinichi Sekiya, all of Tokyo, Japan[73] **Assignee:** Mitsubishi Metal Corporation, Tokyo, Japan[21] **Appl. No.:** 435,200[22] **Filed:** Nov. 9, 1989[30] **Foreign Application Priority Data**

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[51] **Int. Cl.⁵** C22C 32/00[52] **U.S. Cl.** 428/614[58] **Field of Search** 428/614[56] **References Cited****FOREIGN PATENT DOCUMENTS**

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Primary Examiner—H. Dean**Assistant Examiner**—David Schumaker**Attorney, Agent, or Firm**—Scully, Scott, Murphy & Presser[57] **ABSTRACT**

A blade member for cutting-tools includes a cermet substrate which contains, apart from unavoidable impurities, a binder phase and a hard dispersed phase. The binder phase contains 5% to 30% by weight of cobalt and/or nickel. The hard dispersed phase contains a balance composite carbonitride of titanium and one or more of the elements tungsten, molybdenum, tantalum, niobium, hafnium and zirconium. The composite carbonitride satisfies the relationship $0.2 \leq b/(a+b) \leq 0.7$, where a and b denote atomic ratios of carbon and nitrogen, respectively. The substrate includes a hard surface layer in which the maximum hardness is present at a depth between 5 μm and 50 μm from a substrate surface thereof. The substrate surface has a hardness of 20% to 90% of the maximum hardness.

4 Claims, 2 Drawing Sheets